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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/708,224
Filing Date: February 18, 2004
Appellant(s): NATSUHARA ET AL.

James Judge
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 12/27/06 appealing from the Office action mailed 3/8/06.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi (US 6,071,465).

Kobayashi shows a semiconductor manufacturing device including a substrate with a resistive heating element, a substrate-supporting shaft joined to the substrate, wherein each surface of the substrate and the supporting shaft is grinded to have the surface roughness of .1 *u*m and a flatness of .1 *u*m (see column 13, lines 7-11; and Figure 10). But, Kobayashi does not explicitly show the claimed distance where the distance between the central axis of the shaft and the center of the substrate is 5% or less of the diameter of the wafer-carrying side of the substrate.

Kobayashi shows in Figure 10 that the center of the supporting shaft is aligned with the center of the substrate. While the claimed distance is not explicitly disclosed, it would have been obvious to one of ordinary skill in the art to have the center of the supporting shaft be aligned with the center of the substrate within the claimed range to prevent unbalancing of the substrate on the supporting shaft as the substrate is further provided to support a wafer thereon. The balancing of the substrate would be vital for proper processing of the wafer as it needs to be properly positioned on the substrate for even heat distribution without being moved more to one side or to the other.

Kobayashi further shows that the substrate and the supporting shaft are made of aluminum nitride as that of the disclosed invention, and since Kobayashi shows the same structure as that of the claimed invention, Kobayashi would inherently meet the claimed thermal

expansion of coefficient along with the claimed temperature distribution in the wafer-carrying side of the substrate within 1.0%.

(10) Response to Argument

The applicant argues since Kobayashi does not show the claimed distance between the center axis of the shaft to the axial center of the wafer-carrying side of the substrate. The examiner does not contend that Kobayashi explicitly shows such claimed distance, but contend that it would have been obvious to one of ordinary skill in the art to provide the axial centers of the substrate and the shaft within the claimed distance.

As presented in the ground of rejection, having the same coaxial centers for both the substrate and shaft would have been obvious to maintain a good balance upon which a work-piece such as a wafer is to be placed, and having a stable and balanced heating surface would have ensured an uniform heating across the heating surface without having the wafer titled more to one side than the other.

Kobayashi realizes the importance of having a proper machined surfaces and the flatness of the device that is in a micro scale having less than 5 microns and 0.5 mm, respectively. The wafer carrying side generally has a diameter range of 200-300 mm which is well known in the art, and the gap that would have been resulted due to the 5 % range would have been about 10-15 mm between the axial centers of the substrate and the shaft which would be in the order of more than 10000 times of the micro scale in terms of microns and more than 10 times in terms of millimeter. Such discrepancies are enormous when Kobayashi is concerned about the micro scale scope of its device, and such discrepancies would not have been desirable to maintain a stable heating condition for a wafer. Furthermore, having a more balanced relationship between the

substrate and shaft would have created a more balanced thermal mass and thermal transfer between the two that would have created more uniform heating distribution along the heating surface.

The applicant argues that the examiner's position is without factual basis and with error in reasoning, no prima facie case is supported in the rejection. But in view of the Kobayashi drawing figure 10 which shows the substrate and shaft having a coaxial center and in view of the dimensional scale by which Kobayashi was concerned about, it would have been obvious to one of ordinary skill in the art to align the center of the shaft and the wafer carrying side of the substrate within the recited 5 % or less so that a wafer can be more stably positioned on the substrate while ensuring uniform surface heating distribution along its wafer carrying heating surface.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

For the above reasons, it is believed that the rejections should be sustained.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

Respectfully submitted,

Sang Paik

Conferees:

Robin Evans

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